

Injector Diagnostics Upgrade – PAR Bunch Cleaner Project #68

*Nick Sereno
Booster Manager
PAR Manager
Linac Deputy Manager*

September 28, 2004

Argonne National Laboratory



*A U.S. Department of Energy
Office of Science Laboratory
Operated by The University of Chicago*



Division: AOD

Proposal ID: 68

Project: Inj. Diag Upgrade – PAR Bunch Cleaner

Objective: Design, develop and install an operational system that will remove unwanted bunches from the PAR before injection into the storage ring (SR). A proof of principle experiment was completed that demonstrated the idea is feasible.

Background Information:

This is a “New Initiative” and is rated a “Significant Improvement”.

2 Year Project – FY05 design and develop the system.
FY06 Install and commission.

Justification:

- An important group of users expect good bunch purity for timing experiments.
- These users are the primary motivation for the most-used 24 singlets top-off mode.
- These users want only 24 buckets filled in the mode.
- Some of these users want the rest of the buckets to be empty to 1 part in 10^8 .
- Bunch purity spec is a benchmark parameter for the storage ring similar to emittance, coupling etc. for these users.
- The PAR is the machine that determines SR bunch purity and this cleaning system would insure that only a single bunch leaves the PAR.
- PAR bunch cleaning would provide a way to preserve bunch purity during user operations in the event the PAR rf systems are mistuned, trip or glitch.

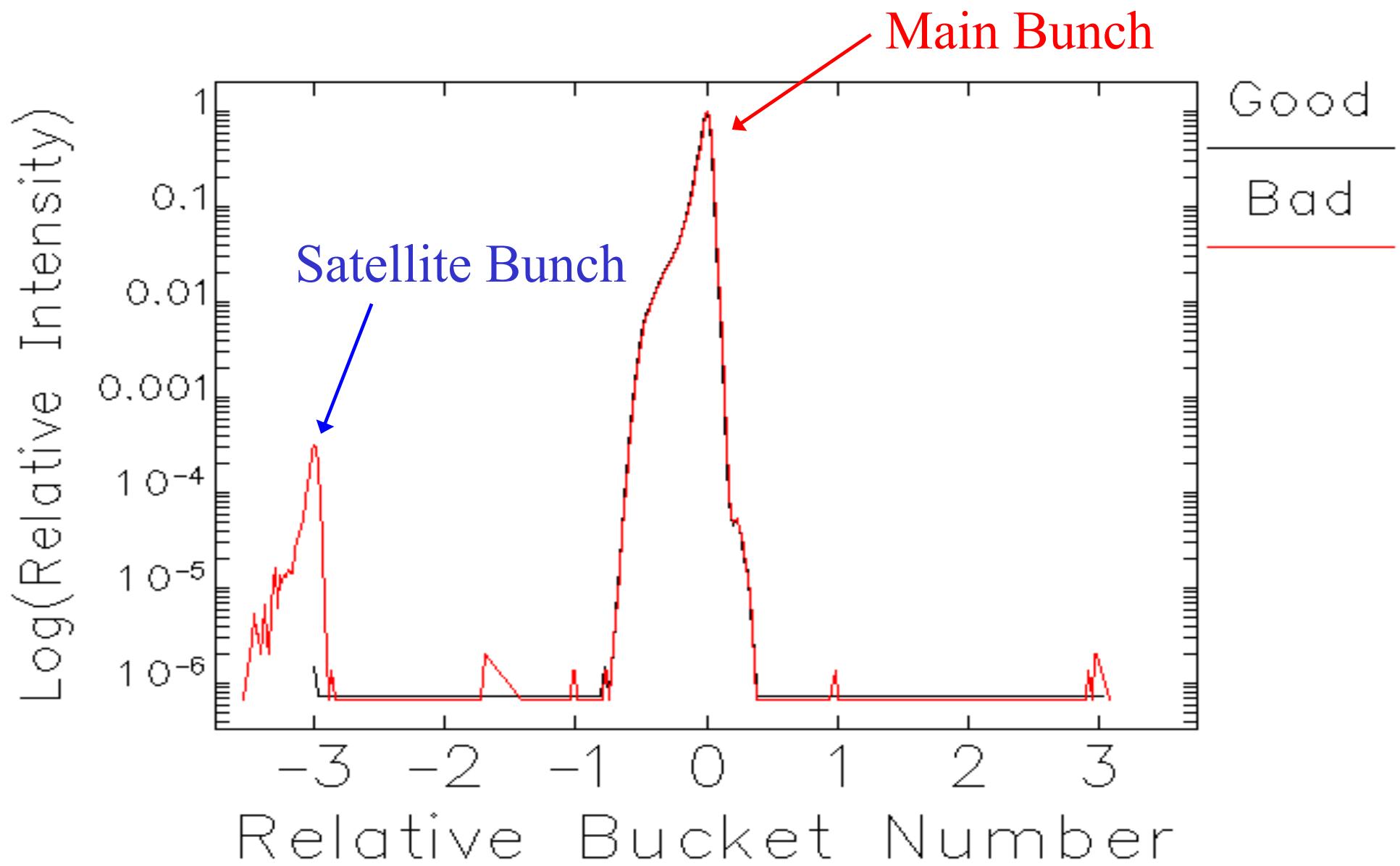
Consequence:

- Presently, if bunch purity is corrupted the only recourse is to dump the SR beam, retune the PAR and refill, which occurred on one occasion during run 2004-02.
- It provides a diagnostic to detect PAR mistuning that would allow PAR retuning without corrupting bunch purity.

Cost:

FY	2005	2006	Total
Noneffort	\$175 K	\$46 K	\$221 K
Effort	\$189 K	\$230 K	\$419K
Total	\$364 K	\$276 K	\$640 K

Good Vs Bad Bunch Purity



PAR Bunch Cleaning System Block Diagram

